Original Article

Perfusion Services National Process Improvement Benchmarking

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ABSTRACT

The Joint Commission on Accreditation of Health Care Organizations recommends national and regional benchmarking in the quality improvement process. Benchmarking is comparing your organization's patient care process outcomes to the best. This communication describes a national benchmarking process for peer comparison of indicators in perfusion patient services process improvement.

A databasing communication aplet was designed to facilitate national benchmarking as part of a larger perfusion service management software application. When patient information is entered in the patient database post precedure, patient-specific numeric data and 'yes'/'no' queries are entered at the clinical site. At any time, the local perfusionist system manager may transmit their own data and receive national database group results by modem and a 1-800 phone number. Local indicator outcomes are compared to national results. Strategies are employed to assure that institution and patient name remain anonymous and institution specific data are stored at the clinical site. Participating institutions employ an e-mail aplet to discuss and decide which indicators to employ as a group.

Nine institutions have contributed outcome data for more than 6,425 cardiopulmonary bypass (CPB) procedures to a national database for ten months. National and institutional means for six discrete CPB outcome parameters are compared. The percent 'yes' responses to four procedure-related questions are compared. Joint Commission recommended benchmarking is accomplished while patient care is improved by comparing outcomes.

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INTRODUCTION

The benchmarking process has been used extensively to evaluate and improve performance in business and industry (1). Successful benchmarking as part of continuous quality improvement (CQI) and process improvement can be an effective means to contain or reduce cost and to improve patient outcomes and quality of care.

Benchmarks are the tools that can be compared across institution departments or between institutions to measure process output (2). Benchmarking compares performance to understand what is possible and how others have achieved higher levels of performance (3).

Care-givers can collaborate with vendors to benchmark contractual terms, identify and negotiate improvement priorities, and measure their success (4). Vendors can manage and allocate their resources to meet the increasing needs of their customers. Groups such as the University Health System Consortium (5, 6), the New England Cardiovascular Study Group (7), the American Heart Association thrombolytic therapy teams (8), and the Benchmarking Effort for Networking Children's Hospitals (BENCH) (9) have used shared databasing and collaborative benchmarking to solve common problems and achieve measurable improvements.

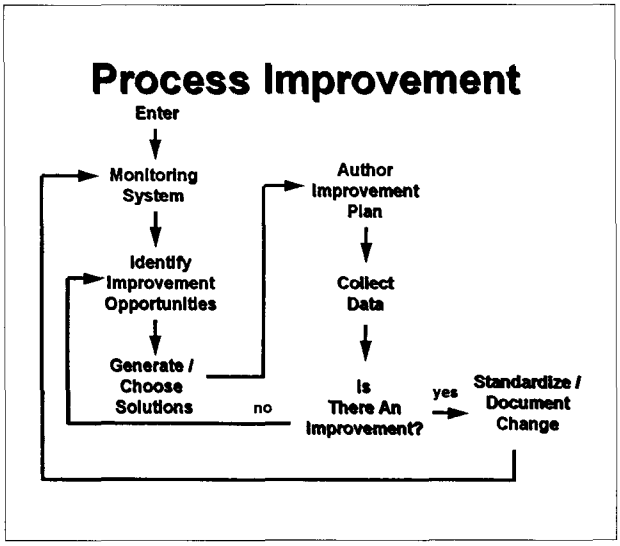
Third party payers, employers, health maintenance organizations, and accrediting organizations such as the Joint Commission for Accreditation of Health Care Organizations (JCAHO) have played an important role in moving health care organizations toward the use of outcomes to measure quality (10) and the results of patient management efforts to reduce costs (11). Open heart surgery care teams are employing clinical critical pathways to develop a clear understanding of their own processes. Measuring its own performance allows the institution to identify variances between its processes and those of the benchmark hospitals and to select which variations the hospital should adopt (12).

Collaborative benchmarking in healthcare may be divided into five phases in its development (13):

1. Benchmarking involves the formation of a voluntary network.
2. Decision makers at sponsoring organizations select the benchmark topics.
3. Project stakeholders establish a charter.
4. Participants identify internal and external benchmark indicators.
5. Participants follow the JCAHO Plan-Do-Study-Act cycle.

The principles of benchmarking are simple and the process is not complicated. Benchmarking is a structured framework for pursuing goals in an organized way (14). Figure 1 outlines the complete cycle of process improvement (13). Processes are examined, indicators are identified, measured, and analyzed.

Figure 1: Flow chart depicting the steps in process improvement as part of continuous quality improvement



Benchmarking adds the additional step of comparing to a national or regional mean value to identify the "best" set of processes. Once the benchmark institution and the best practices are identified, the secrets to their success may be shared with the participating organizations.

It is logical for perfusion service departments to desire to contribute to a common database and gain objective feedback as to their institution's performance to facilitate patient care. A first attempt and the results for a national benchmarking effort for perfusion services is described in this paper.

MATERIALS AND METHODS

Many perfusion service groups have been employing a computer software package[a] to conduct internal databasing to comply with regulatory organization requirements and to monitor their own process improvement activities (Abstract: Riley JB, Davis JP, Hoff W, et al. Perfusion service continuous quality improvement software. Proc Amer Acad Cardiovasc Perf 1996; 17: 92-4). With the leadership and collaboration of Avecor Incorporated, a subgroup of users agreed to submit cardiopulmonary bypass (CPB) outcome indicator data to a central database. In consultation with the participating perfusion groups, the value of six outcome indicator parameters and the reply to four 'yes'/'no' questions were collected (Table 1).

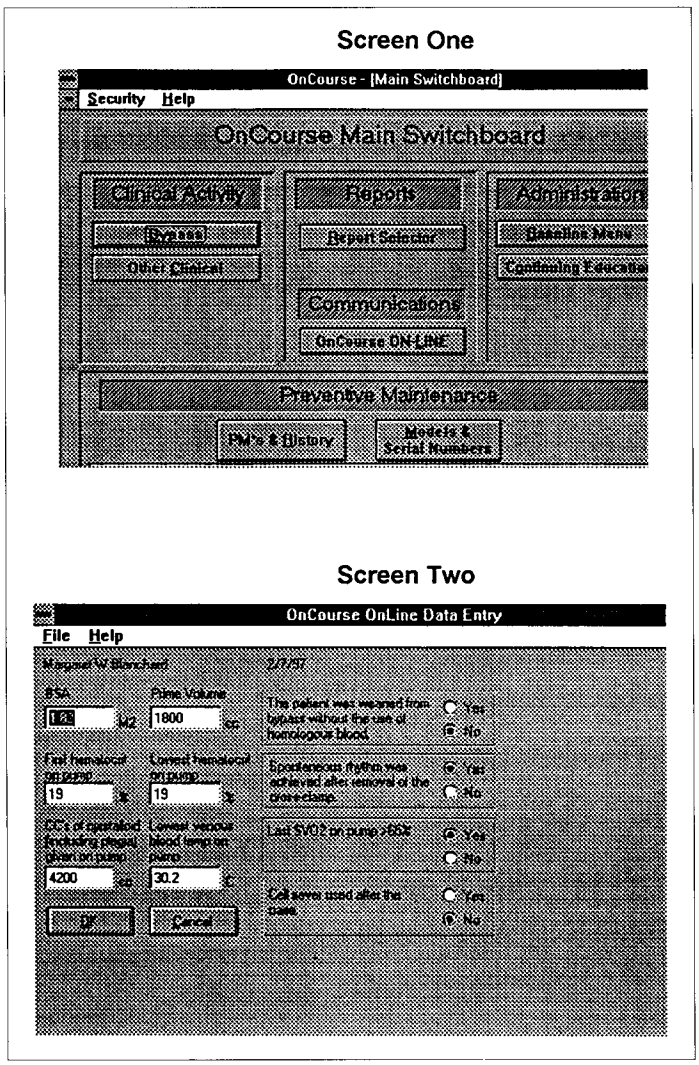
An aplet within the perfusion service software allows the participants to collect and submit specific indicator data to the central database (Figure 2). The application software also allows the participants to obtain a report presenting the group data de-

a OnCourse, Avecor Cardiovascular, Inc., Minneapolis, MN 55428

Table 1: The discrete and 'yes'/ 'no' question inquiries made after every CPB procedure

Discrete Data	Yes/No Questions
1. Body surface area in m^2	1. The patient was weaned from bypass without the use of homologous blood?
2. Prime volume in ml	2. Spontaneous rhythm was achieved after removal of the cross clamp?
3. First hematocrit on pump in %	3. Last SvO2 on pump > 65%?
4. Volume of crystalloid (including plegia) given on pump in ml	4. Cell saver used after the case?
5. Lowest hematocrit on pump in %	
6. Lowest venous blood temp on pump in °C	

Figure 2: Computer Screen One: The main OnCourse switchboard. The OnLine button is selected to retrieve the institutions' national benchmark data. Computer Screen Two: The OnCourse OnLine data entry screen. The variable values listed in Table 1 are collected and stored for later phone transfer to the national database.



scriptive statistics and their own outcome data (Figure 3). The percent 'yes' reply for the nominal variables is calculated and reported for the group and the institution.

RESULTS

As of March 1997, nine hospital have submitted data for more than 6,425 CPB patients to the central database.

Screen Four (Figure 4) presents the data for the benchmark institution with the greatest percent yes responses to achieving a spontaneous rhythm and the last pump $SvO_2 > 65\%$. Screen Five (Figure 5) presents the report for the benchmark institution for the lowest mls of crystalloid given on pump. Screen Six (Figure 6) presents the benchmark institution with the greatest percent of patients weaned from CPB without the use of homologous blood and the highest and lowest hematocrits on pump.

DISCUSSION

The early results for perfusion service national databasing benchmarking have provided the following advantages as reported by the participating institutions. The experience of this group is similar to advantages previously reported in the benchmarking literature. Benchmarking:

1. Results in quality practices to satisfy accreditation standards but also to focus quality management to improve services in an economic manner.
2. Helps to reduce variation in practice and improve quality.
3. Creates ongoing communication among the participating hospitals, whose staff members have been willing to share problems encountered and possible solutions and there is an organized forum for data discussion.
4. Is an effective means to help reduce costs while improving patient outcomes and quality of care.
5. Helps group members to examine their current, not just their past, practice.

FUTURE PLANS

For the collaborating group, the next step is to review their experience, results, and processes, then meet to select the next parameters to database and study. According to the flowchart in Figure 1, each participating organization will continuously develop plans to improve their patient care processes. Out of these plans will come recommendations to database specific outcome parameters

Figure 3: Computer Screen Three: The OnCourse OnLine data reporting screen retrieved by modem from the national database

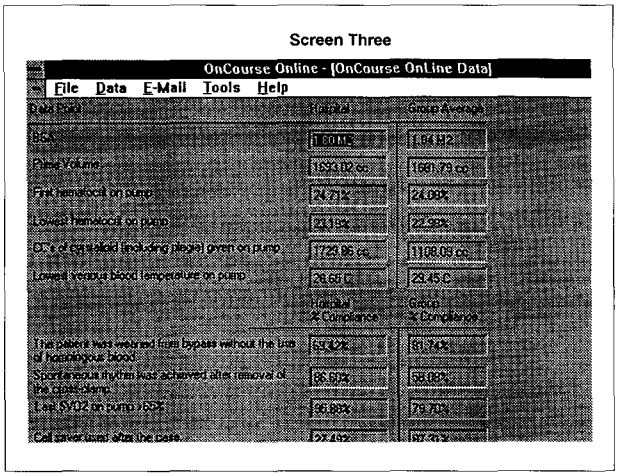


Figure 4: Computer Screen Four: Benchmark institution data results screen

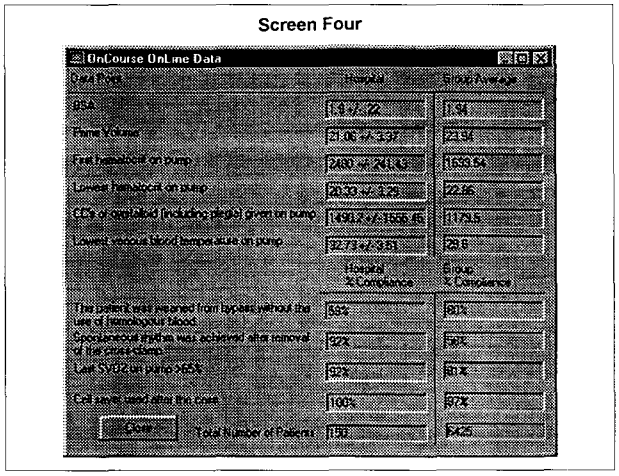


Figure 5: Computer Screen Five: Benchmark institution data results screen

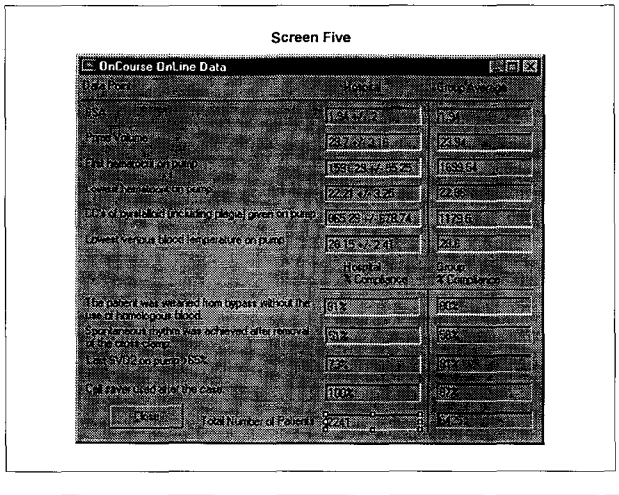
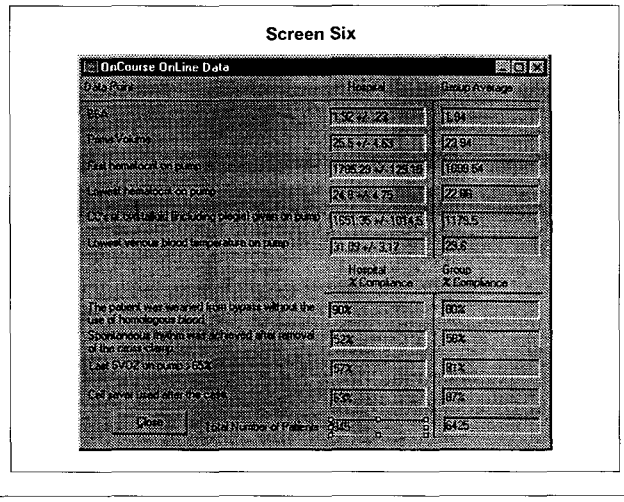


Figure 6: Computer Screen Six: Benchmark institution data results screen



nationwide to allow inter-institution comparison.

The software will be upgraded to allow additional filtering of the comparison by the type of institution prior to statistical analysis. Sample size, mean, standard deviation, and 95% confidence interval for the group and institution data will be presented on the report window. A two-sided t-test will be performed to identify any significant difference between the group and institution data sets and a p value will be reported.

One future evolution of the perfusion service benchmarking method described here will include adaptation to facilitate data entry and result retrieval via the internet.

SUMMARY

In summary, the JCAHO recommends that hospitals improve organizational performance. According to the JCAHO, some of the approaches that represent improvement efforts include "designing a new service, flowcharting a clinical process, experimenting with new ways of carrying out a function, or comparing the hospital's performance to other hospitals" (11). We have illustrated a successful, functioning, computer-based method to compare one hospital's perfusion service outcomes to another consistent with JCAHO's recommendations to be involved in process improvement efforts.

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